

## Role of Autologous Platelet Rich Plasma in Adult Burns

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### ABSTRACT

Autologous platelet rich plasma (APRP) has gained its importance in medical field since its first use in sports medicine and open heart surgeries. It is widely used in plastic surgery and in cosmetic medicine because of its wound healing properties.

The autologous platelet rich plasma, rich in growth factor can be used for the management of adult burns.

**Keywords:** Autologous; Platelet; Plasma; Burns.

### INTRODUCTION

The autologous platelet rich plasma as the name suggest is the patient own platelet rich plasma. Platelets contain growth factor and cytokines, which are thought to play a role in reducing inflammation and also aid the healing process.

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### METHODS AND MATERIALS

This study was carried out in the department of Plastic Surgery in a tertiary care centre in South India after getting written informed consent from the patient and approval from the department. A 55 years old male presented to the casualty with 2nd degree flame burns in 15% of his total body surface area. (Fig. 1) Burn area was infiltrated with APRP. On further observation the burn wound healed without any complications.

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Fig. 1: Intial burn wounds

Technique of Autologous platelet rich plasma preparation followed was the standard technique as described by Franco *et al.* and Li *et al.* The steps of Autologous platelet rich plasma preparation are as follows:

**Step 1:** A 10 ml of the patient's venous blood was taken and heparinized.

**Step 2:** Centrifugation at 3000 RPM continued for 10 minutes. Three layers formed in the tube at the end of 10 minutes.

**Step 3:** The upper layer of the three layers was aspirated using sterile needle and syringe.

**Step 4:** Re-centrifugation at 4000 RPM for 10 minutes. At the end of 10 minutes, the content separated into two layers.

The bottom layer is the plasma rich in platelets and was aspirated using sterile needle and syringe. The Autologous platelet rich plasma is infiltrated under all aseptic precautions to the burn wound

site. (Fig. 2) The donor site was given compression dressing in the form of an elastocrepe bandage and the limb was kept elevated at the foot end with pillow for three weeks. The donor site was evaluated with Vancouver scar scale score at the beginning of each session.



Fig. 2: Showing APRP in burn wound site

## RESULT

Following 2 session of Autologous platelet rich

plasma, the burn site healed without scarring (Fig. 3). The use of Autologous platelet rich plasma also decreased the hospital stay.



Fig. 3: At the time of discharge

## DISCUSSION

Autologous platelet rich plasma (APRP) as the name implies refers to the plasma derived from the patient's own blood with a platelet count higher than the platelet count in the peripheral blood of the patient. Historically having been used to treat thrombocytopenia, the use in other specialities became wide spread with its use in sports medicine to treat musculoskeletal injuries. Its use in wound management results from the observation that wounds have a proinflammatory environment that impairs healing. In addition, wounds have a high protease activity that impairs functioning of growth factors. Autologous platelet rich plasma used in a chronic wound serves as a source of growth factors and thence has mitogenic, angiogenic and chemotactic properties. Autologous platelet rich plasma has also been shown to stimulate human dermal fibroblast proliferation and thus increasing the deposition of type I collagen, the above mechanism being proposed to its use in scar management.<sup>1,3</sup> Application of activated Autologous platelet rich plasma also provides 5 to 10 times the normal concentration of growth factors that include PDGF, VEGF, TGF- $\beta$  locally also accelerating wound healing. Addition of calcium salts also helps in activation of platelets.<sup>7,8,9</sup>

Usually, around 1 to 1.5 ml of Autologous platelet rich plasma can be obtained from 10 ml of patient's blood. Hence, the disadvantage of the use of Autologous platelet rich plasma lies in its use in wounds of a large surface area that would require a large volume of blood which in a patient with a chronic non healing wound or a traumatic wound requires consideration.

## CONCLUSION

Autologous platelet rich plasma is an effective measure in improving scar remodelling and is a good choice for treating burn wounds.

*Conflicts of interest:* None

## DECLARATIONS

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## REFERENCES

1. Rubina Alves, Ramon Grimalt. A review of platelet-rich plasma: History, biology, mechanism of action, and classification. *Skin appendages discord* 2018; 4:18-24.
2. Mahmoud Makki, Abd El Khalek H Younes, Abdelrahman Fathy, Omnia Y Abd EIDayem, Hanan Morsy. Efficacy of platelet-rich plasma plus fractional carbon dioxide laser in treating posttraumatic scars. *Dermatol Ther* 2019 Sep;32(5): e13031.
3. Padmalakshmi Bharathi Mohan, Saurabh Gupta, Ravi Kumar Chittoria, Abhinav Aggarwal, Chirra Likhitha Reddy, Imran Pathan, Shijina Koliyath. Autologous Platelet-rich Plasma Enriched Pixel DONORing. *Journal of Cutaneous and Aesthetic Surgery*, Volume 13, Issue 4, October-December 2020.
4. Barbara Hersant, Mounia SidAhmed-Mezi, Romain Bosc, Jean-Paul Meningaud. Autologous Platelet-Rich Plasma/Thrombin Gel Combined with Split-Thickness Skin DONOR to Manage Postinfectious Skin Defects: A Randomized Controlled Study. *Adv Skin Wound Care*. 2017 Nov;30(11):502-508.
5. Claudia S Cohn, Evelyn Lockhart. Autologous platelet-rich plasma: evidence for clinical use. *Curr Opin Hematol*. 2015 Nov;22(6):527-32.
6. Sudhanva H.K., Panday S, chittoria RK, Mohapatra DP, friji MT, Dinesh KS. Role of APRP in the successful uptake of Split Skin DONOR. *Dermatology international* Volume 1 number 2 July to December 2016.
7. Elankumar S, Sudhanva H.K., Abhinav A, Chittoria R.K. APRP spray devices: a novel technique of applying APRP. *Dermatology international* Volume 2 number 2, July to December 2017.
8. Weibrich G, Kleis WK, Hafner G, Hitzler WE,. Growth factor levels in platelet- rich plasma and correlation with donor age, sex and platelet count. *Journal of cranio-maxillofacial surgery*. 2002; 30(2): 97 -102.
9. Yuan T, zhang CQ, Tang MJ, Guo SC, Zeng BF. Autologous platelet-rich plasma enhances healing of chronic wounds. *Wounds*. 2009;21(10): 280-5.

